

VALUING HIGH-PERFORMANCE HOUSING:

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to scroll through this 14-page document.



**A cost/benefit analysis of green and solar housing
at MOSIER CREEK HOMES, Mosier, Oregon**

Peter Erickson
President:
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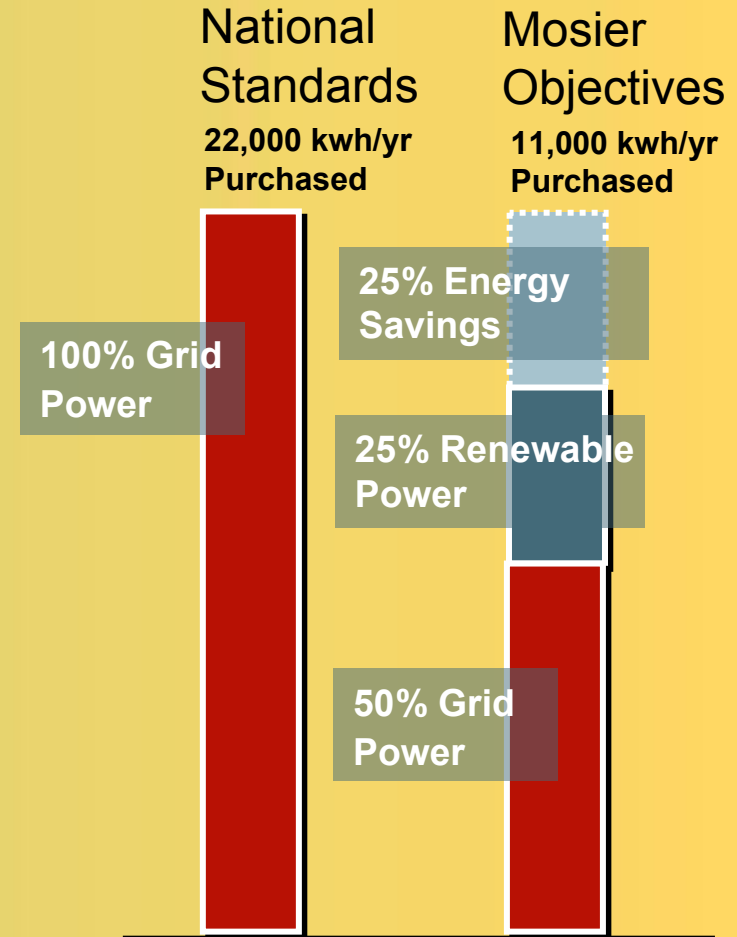
What is High Performance Housing?

- It's energy efficient
- It incorporates onsite renewable power



Mosier Creek Design Objectives

- The only source of energy in Mosier is electricity from the grid
- The majority of US grid power is coal fired or nuclear generated
- We targeted a 50% reduction in grid power through two methods.
- Achieve energy savings through conservation
- Generate renewable power onsite



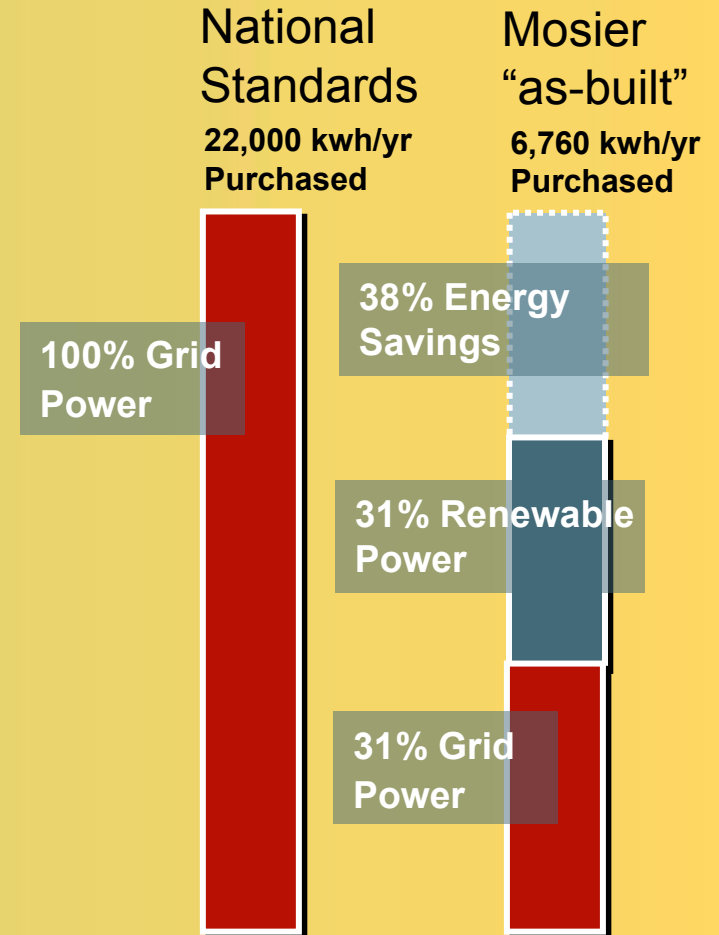
Mosier Creek _ From Design Objectives to “As-built” Performance



Mosier Creek

“as-built” Performance

- Mosier Creek was completed this past June, 2007
- Its metered draw from the grid is 69% less than the National Standard and 38% less than our target.
- The cost to achieve this was \$4,900 per residence.
- This cost represents slightly more than 1% of the \$365,000 sale price for a 1,600 sq. ft. — 2 and 3 bedroom / 2 ½ bath town home.



How was this accomplished?

1. Build green :

By building to the LEED-H criteria we use 38% less energy to operate than the same home built to the UBC and National Energy Code standard.

2. Generate power:

Solar thermal (water) and photovoltaic (electric) arrays on each roof: generate 50% of each (LEED-H) unit's power needs.



What are the costs to build LEED?

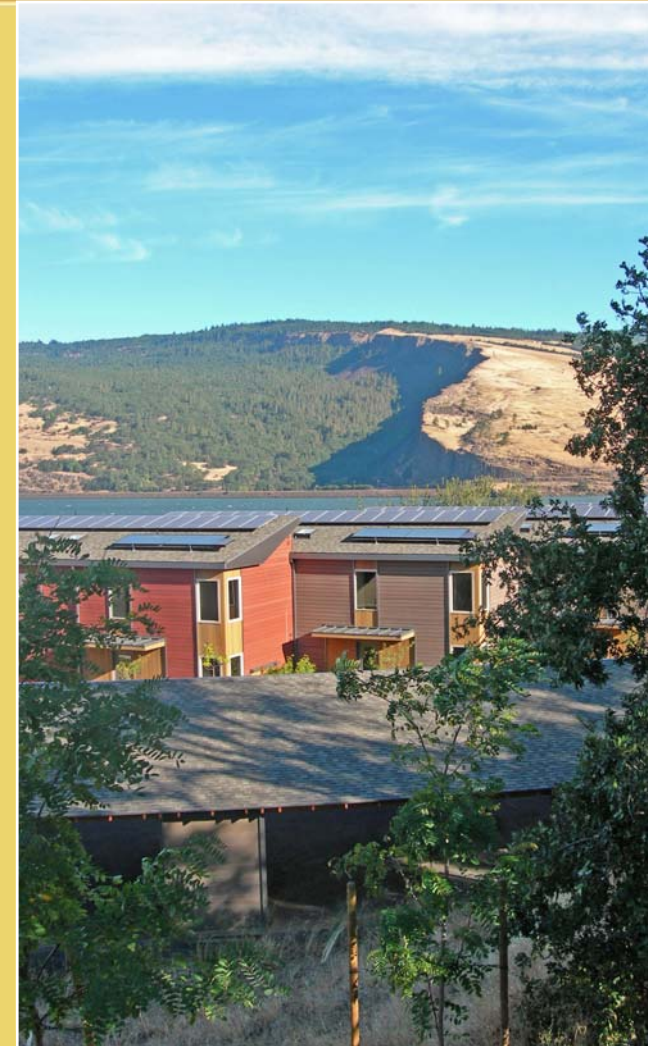
\$4,300/unit

Materials : local and non-toxic	\$250/unit
Construction Waste : Recycle & Separate: Wood / Sheetrock / Metals / Debris	\$500/unit
Framing : change in technique	\$250/unit
Insulation : more of it - correctly applied	\$650/unit
HVAC and Energy Star Equipment	\$1080/unit
HVAC : duct seal and testing	\$450/unit
Landscape : sub-grade irrigation	\$450/unit
LEED-H : Facilitator/Inspector/Certification	\$670/unit



What does \$4,300 for LEED buy the Home Owner?

- **Operational Savings**
\$101/mos. or \$1,214/yr.
- **Certification of a healthy living environment**
Built w/out toxic materials and having good ventilation without threat of mold
- **Customer Pride:**
Every prospective buyer learns how and why purchasing at Mosier Creek decreases the output of CO₂ emissions by *150 tons/home over a 30 year period. Over that same period the reduction in CO₂ by their 34 home community is *4,300 tons.
*(as determined by USGBC KWH formula).



What does it cost to add solar?

PUGET SOUND Business Journal Tax breaks make solar homes more affordable

By [Name] [Title]

Seattle developer Peter Erickson, known for estate projects ranging from mansions to big cabins to luxury resorts, is breaking new ground with another venture: a cluster of solar-powered, low-rise homes in the Mosier Creek area.

With backing from private investors and a plan structured to maximize state and federal tax incentives, Erickson has created homes that are both high-end and high-efficient.

Larry Brown of Seattle chose one for his vacation home, to maintain his investment in the Columbia River environment that he loves while keeping his carbon and energy costs down.

"I know it's something I can possibly keep for the rest of my life and not be as concerned about the cost of heating and cooling it," he said. "The sun's not going to go away and it's not going to cost more to use it."

Of the Mosier Creek project's 14 units, the 12 three-bedroom homes will cost roughly \$250,000, and the 12 smaller flats will be about \$150,000. Brown said his own company benefits with other investments in the area west of Portland, which is known for its rich surfing scene and natural beauty.

Erickson describes the project as "a terrifically high performance housing." For the price, a buyer gets a home that uses 30 percent less energy than the national standard and derives 25 percent to 30 percent of its energy from solar power.

Located in both energy-efficient homes and solar power has grown rapidly in the Pacific Northwest in recent years. Since 2000, more than 4,000 new homes have been certified as "Solar Green," by the Mosier Creek Association of Building Professionals, a local certification for energy-efficient and sustainably built dwellings.

And more businesses and residents are getting interested in solar energy and installing it on roofs.

In total, Mosier Creek will cost about \$30 million, Erickson says, with the 10-year plan to build the homes in the area west of Portland, which is known for its rich surfing scene and natural beauty.

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Mosier Creek development on the Columbia River is set to be built by Peter Erickson. The homes are designed to be energy-efficient and sustainable.

"The sun's not going to go away, and it's not going to cost more to use it."

Larry Brown, purchases, Mosier Creek Association

But given producers' LEED certification, a designation from the U.S. Green Building Council that stands for Leadership in Energy and Environmental Design, the LEED program encourages high-performance, sustainable buildings, and the certification has in the past been applied mostly to commercial or government projects.

Making the solar LEED-certified project cost about 2 percent to 3 percent, Erickson said. The solar equipment cost about \$20,000 per home, Erickson said — \$22,000 for the photovoltaic system that produces electricity and about \$1,000 for a solar water heater.

Making the homes qualify for Erickson, his investors and the homeowners involved setting up an unusual business arrangement. For the first six years, Erickson's company will own the solar panels and operate as a small, solar utility, keeping the solar tax breaks that are available for commercial entities but not for homeowners. Using those tax breaks, he'll be able to sell power to the homeowners for about 20 percent less than the market rate.

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SOLAR: Seattle developer's 'high-performance housing'

By [Name] [Title]

Seattle developer Peter Erickson is betting he can create the first in a new class of high-performance housing.

A combination of Oregon state and federal tax incentives is helping to bring costs down significantly. Solar consultant Doug Ralston, who worked with Erickson on the project, figured that over the course of 20 years, a typical life span for a photovoltaic system, Mosier Creek's owner would not realize 15 cents per kilowatt-hour. But if the system lasted only 10 years, the owner would cost roughly 15 cents per kilowatt-hour, said

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Ralston, principal of Erickson, the Seattle-based, Cascade Solar Consulting LLC.

Inspired by the incentive and state and federal tax incentives, Erickson is betting he can create the first in a new class of high-performance housing.

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- **Added Cost to Sale Price : \$600/unit**
For the soft costs/unit for solar engineer, legal and accounting, etc.

- **Installed Cost : \$28,000/unit.**

For solar equipment with a 30 year life generating 50% of each home's energy needs.

- **Less Energy Tax Credits of \$21,000**
By having the development LLC (a for-profit business) own and operate the solar equipment for 5 years, it was able to sell state and federal tax credits to high income investors (banks, etc).

- **Re-Sale: \$7,000 :**

At the end of 5 years, the LLC will offer the Home Owners the ability to purchase the solar equipment for approximately \$7,000.

www.mosiercreek.com

What's the benefit of solar to the home owner?



- **Savings:**
For the first 5 years their solar power is sold to them by the LLC at the Grid Price less 15%.
- **Lifetime Control of Operating Costs**
At the end of 5 years the Home Owner can buy the solar equipment with a 25 yr. remaining life and with a 20 year warranty for approx. \$7,000.
- **No risk:**
If the Home Owner decides that buying half their energy needs for the next 25 years isn't worth \$7,000 (which amortizes in 8 years from savings based on 2007 rates) he or she can elect to pay the grid price.

Mosier Creek : Energy Comparison Summary

Assume two identical 1,600 sq.ft / 2 storey town homes.

“Baseline” unit is built per UBC and National Energy Code	kwh/yr	Energy Consumption	Annual Per kwh \$0.104
Power From Grid	22,000	100%	\$2,288

Mosier Creek: LEED-H and Solar	kwh/yr	Energy Consumption	Annual Per kwh \$0.104
LEED-H Savings Over UBC National Standard	(8,440)	(38%)	(\$878)
Power from Grid	6,670	50%	\$703
Power from Solar Hot Water (Free to owner)	2,600	19%	0%
Power from Solar Electric (15% off grid price)	4,200	31%	\$371
Mosier Creek Home Owner Energy/Expense	13,560	100%	\$1,074

Monthly Savings \$101

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Why LEED-H and Solar as the developer?

- **Small incremental cost:**

The cost/unit (assuming 25 units or more) of \$4,300 for LEED and \$600 for solar is minor in the overall budget.

- **Marketing Power.**

It buys an unequaled competitive edge. Given comparable units--one LEED and Solar / the other built to the UBC and National Energy Code , the green developer can sell a product that is...

- 47% less costly to operate ...
- Certified healthy ...
- Has Customer Pride ... Regardless of ones perspective on global warming the environmental moral dynamic has sold a lot of Prius automobiles.

- **No Risk :**

If a Home Owner doesn't want to buy their solar equipment at the end of 5 years, the developer joins the ranks of other profitable PUDs and sells power to the grid.





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